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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,740	03/04/2004	Jin-Hwa Hco	239/167 DIV	3615

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EXAMINER

DEO, DUY VU NGUYEN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 12/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/791,740

Applicant(s)

HEO ET AL.

Examiner

DuyVu n. Deo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 12-22 is/are rejected.
- 7) ☒ Claim(s) 5-11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☒ Certified copies of the priority documents have been received in Application No. 10/215,342.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3/4/04.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1 are rejected under 35 U.S.C. 102(e) as being anticipated by Witek et al. (US 6,146,970).

Witek describes a method for forming STI comprising: providing two trenches (claimed first and second trench in a first and second region) on substrate (fig. 6); forming a lower isolation pattern to fill a lower region of the trenches (this forms a lower isolation pattern to fill a lower region of the first trench) (fig. 10); forming an upper isolation pattern to fill an upper region of the first and second trench (fig. 11).

Referring to claim 4, the method further comprises of forming a pad oxide pattern and a poly mask pattern (claimed polishing stop layer) and etching the substrate using the poly mask (col. 6, line 10-52).

Referring to claims 12, 13, the method further comprises of planarizing the upper isolation layer by CMP to expose the top surface of the substrate (fig. 12; col. 8, line 29-35).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 3, 17, 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Witek as applied to claim 1 above, and further in view of admitted prior art.

Referring to claims 2 and 3, Witek doesn't describe the second trench is wider than the first and the first and second regions are cell array and peripheral circuit region; however, admitted prior art, in pages 1-5 shows that this structure is known to one skilled in the art. Therefore, at the time of the invention, one skilled in the art would find it obvious to form this structure depending on the type of device being manufactured so that a multi-layered structure can be formed with a reasonable expectation of success.

Referring to claims 17, 20-22, Witek further describes the upper isolation pattern can be formed of oxide layer (TEOS) (col. 11, line 18-20) and admitted prior art further shows the isolation layer can be formed from either HDP oxide or USG layer. Witek describes densify the lower isolation pattern (col. 7, line 21) and admitted prior art also shows how to densify the isolation pattern by thermal or curing process by oxidizing the silicon atoms in the SOG layer (paragraph [0005]) of the specification.

5. Claims 14-16, 18, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Witek as applied to claim 1 above, and further in view of Park et al. (US 6,326,282).

Referring to claims 14-16, Witek doesn't describe forming the nitride liner on the first and second trenches. Park teaches a method of forming isolation trench wherein he describes forming about 30-200 angstrom of LPCVD nitride liner on the isolation trench (col. 4, line 32-40). It would have been obvious for one skilled in the to modify Witek's method in light of Park

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because Park teaches that the nitride liner serves as a stress buffer layer to relieve the stress applied to the trench interior walls (col. 4, line 32-43).

Referring to claims 18, 19, Park further teaches of forming a LP-TEOS (claimed LPCVD oxide layer) on the substrate including the nitride layer before filling the trench (claimed before forming the HDP oxide layer) (col. 4, line 44-52).

*Allowable Subject Matter*

6. Claims 5-11, 18, 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 5-11 are allowed because applied prior art doesn't suggest or teach the steps of claims 5 and 9.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n. Deo whose telephone number is 571-272-1462. The examiner can normally be reached on 6:00-2:30 Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Primary Examiner  
Duy-Vu N. Deo  
12/19/05

